

Appl. No. : 10/724,534
Filed : November 26, 2003

REMARKS

The October 12, 2006 Final Office Action was based on pending Claims 1–20, 22, 31, 33, 37–40 and 42–47. By this Response, Applicant is amending Claims 1–3, 5, 6, 12, 13, 31, 37, 39 and 40 and is cancelling Claims 7, 22 and 45–47 without prejudice or disclaimer. Claims 4, 8–11, 14–20, 33, 38 and 42 remain as originally filed or previously presented.

Thus, after entry of the foregoing amendments, Claims 1–6, 8–20, 31, 33, 37–40 and 42–44 are pending and presented for further consideration. In view of the foregoing amendments and the remarks set forth below, Applicant respectfully requests allowance of Claims 1–6, 8–20, 31, 33, 37–40 and 42–44.

SUMMARY OF OBJECTIONS AND REJECTIONS

The October 12, 2006 Office Action rejected Claims 1–4, 8, 9, 11–16, 18–20, 31, 33, 37, 39, 40 and 43–46 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,948,100 to Hsu et al. ("Hsu") in view of U.S. Patent No. 6,000,008 to Simcoe ("Simcoe"). Claims 5–7 and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hsu and Simcoe, and further in view of U.S. Patent No. 4,860,192 to Sachs et al. ("Sachs").

Furthermore, Claims 10, 17 and 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hsu and Simcoe, and further in view of U.S. Patent No. 5,764,946 to Tran et al. ("Tran"). Claims 38 and 47 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Hsu and Simcoe, and further in view of U.S. Patent No. 6,085,291 to Hicks et al. ("Hicks").

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Submitted concurrently herewith is a Supplemental Information Disclosure Statement citing nine (9) references, which were cited during the prosecution of co-pending related U.S. patent applications. Applicant respectfully requests the Examiner to consider the pending claims in connection with these references in order to make them of record.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103(a)

The October 12, 2006 Office Action rejected Claims 1–4, 8, 9, 11–16, 18–20, 31, 33, 37, 39, 40 and 43–44 as being unpatentable over Hsu in view of Simcoe. Claims 5 and 6 were rejected as being unpatentable over Hsu and Simcoe, and further in view of Sachs. Furthermore, Claims 10, 17 and 42 were rejected as being unpatentable over Hsu and Simcoe, and further in view of Tran. Claim 38 was also rejected as being unpatentable over Hsu and Simcoe, and further in view of Hicks.

In view of the foregoing amendments and for at least the reasons set forth below, Applicant respectfully requests reconsideration of the aforementioned claims.

Independent Claim 1

With particular reference to amended Claim 1, an embodiment of Applicant's invention includes a method of searching data for a match with a data string. The method comprises: routing a series of assembly language instructions to a processor having a first execution circuit for executing arithmetic and logic instructions; analyzing the series of assembly language instructions to detect an instruction to perform a search operation, the search instruction comprising a data string and a starting address; and routing the search instruction undecoded to a data string manipulation circuit, independent of the first execution circuit, capable of performing string manipulation instructions.

The method also includes, among other things, comparing portions of the data string with consecutive portions of cache memory data; generating a match signal for each portion of the cache memory data that matches a respective data string portion; identifying a plurality of match signals indicating the consecutive portions the cache memory data that together match the data string; and routing an address of cache data matching the data string to the data string manipulation circuit.

Neither Hsu, nor Simcoe, nor a combination thereof teaches or suggests the method of amended Claim 1. For example, Hsu appears to be directed to branch instruction prediction in a superscalar pipelined processor. In particular, Hsu discloses certain methods for predicting a branch address in a sequence of instructions using a branch target buffer (see, for example, Figure 9). The disclosed methods include

receiving a search address and simultaneously comparing a tag portion of the search address with tag portions of entries stored in multiple blocks of memory locations in the branch target buffer (see, e.g., col. 13, line 42, through col. 14, line 65).

The October 12, 2006 Final Office Action recognizes that Hsu does not teach several of the limitations of Claim 1 (i.e., recited acts of "comparing portions of test data . . . ; generating a match signal for each portion . . . ; and identifying a plurality of match signals"). Moreover, Hsu does not teach or suggest: (i) routing a series of assembly language instructions to a processor having a first execution circuit for executing arithmetic/logic instructions and a second circuit for performing string manipulation instructions; and (ii) analyzing the series of assembly language instructions to detect and route an undecoded search instruction to the second (data string manipulation) circuit. Rather, Hsu's fetcher 400, which the Office Action identifies as a "data string manipulation circuit," outputs a fetch address (FA) and a search address (SA) based on a series of signals and addresses received from a plurality of components (i.e., decoder unit 120, execution unit 130 and branch target buffer 200).

In addition, Simcoe, which was cited by the Office Action for teaching a plurality of comparators that compare portions of sequential data with consecutive portions of cache memory data, does not teach or suggest the various elements of amended Claim 1 as described above. For instance, Simcoe does not teach or suggest: (i) routing a series of assembly language instructions to a processor having a first execution circuit for executing arithmetic/logic instructions and a second circuit for performing string manipulation instructions; and (ii) analyzing the series of assembly language instructions to detect and route an undecoded search instruction to the second (data string manipulation) circuit.

Because the cited references do not teach each and every element as recited and arranged in amended Claim 1, Applicant respectfully submits that Claim 1 is patentably distinguished over the cited references. Applicant, therefore, respectfully requests the rejection under 35 U.S.C. § 103(a) to be withdrawn.

Independent Claims 12, 31 and 40

Amended independent Claims 12, 31 and 40 are each believed to be patentably distinguished over the cited references for reasons similar to those set forth above with respect to amended independent Claim 1 and for the different aspects recited therein.

Dependent Claims 2-6, 8-11, 13-20, 33, 37-39 and 42-44

Claims 2-6 and 8-11 depend from amended independent Claim 1 and are believed to be patentably distinguished over the cited references for reasons similar to those set forth above with respect to Claim 1 and for the additional features recited therein.

Claims 13-20 depend from amended independent Claim 12 and are believed to be patentably distinguished over the cited references for reasons similar to those set forth above with respect to Claim 1 and for the additional features recited therein.

Claims 33 and 37-39 depend from amended independent Claim 31 and are believed to be patentably distinguished over the cited references for the reasons similar to those set forth above with respect to Claim 1 and for the additional features recited therein.

Claims 42-44 depend from amended independent Claim 40 and are believed to be patentably distinguished over the cited references for the reasons similar to those set forth above with respect to Claim 1 and for the additional features recited therein.

CONCLUSION

In view of the foregoing, the present application is believed to be in condition for allowance, and such allowance is respectfully requested. If further issues remain, the Examiner is cordially invited to contact the undersigned such that any remaining issues may be promptly resolved.

Moreover, by the foregoing amendments and remarks no admission is made that any of the above-cited references are properly combinable. Rather, Applicant submits that even if the references are combined, the references still do not teach or suggest the claimed invention.

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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: 1/11/2007

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